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CITATION:

Ohashi, Gaku. <Note> Papaya Fruit Sharing in Wild Chimpanzees at Bossou, Guinea. Pan Africa News 2007, 14(1): 14-16

ISSUE DATE:

2007-06

URL:

<http://hdl.handle.net/2433/143471>

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&lt;NOTE&gt;

## Papaya Fruit Sharing in Wild Chimpanzees at Bossou, Guinea

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### INTRODUCTION

Food sharing between non-kin of wild chimpanzees has been reported since Goodall's initial study in 1960<sup>1</sup>. Chimpanzees are often reported to share meat<sup>2, 3, 4, 5, 6</sup>. On the other hand, plant food sharing are rarely reported<sup>7, 8, 9, 10</sup>, except for studies from Gombe and Mahale where chimpanzees were formerly provisioned for research and observed sharing sugar canes and bananas<sup>11, 12</sup>.

Most studies discuss food sharing with reference to maintenance of alpha status, social relationships and cooperative hunting<sup>2, 3, 5, 6, 13, 14, 15</sup>. Some studies suggest a relationship between food sharing and female choice, but this claim lacks sufficient evidence<sup>6, 16</sup> and recent studies have tried to refute it with substantial data<sup>13, 17</sup>.

I observed the cases of papaya fruit sharing by wild chimpanzees at Bossou Guinea. The papaya is the largest fruit that Bossou chimpanzees can obtain. Here I discuss the food sharing with reference to mating behaviors.



Fig. 1. Male chimpanzees came back from the village with papaya fruits.

### METHODS

The subjects of this study were wild chimpanzees at Bossou, Guinea<sup>18, 19</sup>. The home range size of this group is about 30 km<sup>2</sup>, but the chimpanzees mainly use 4 km<sup>2</sup> of forest around the village of Bossou. Because their home range is close to human settlements<sup>20</sup>, the chimpanzees often enter the village to raid crops (Fig. 1).

Observations were conducted from July 2002 to March 2003 (Period 1) and from April to September 2004 (Period 2). Group size fluctuated between 13 and 19 during these periods. The number of adult or sub-adult males was 3. The number of cycling females fluctuated between 4 and 5. I used the focal animal sampling method. The target

Table 1. Papaya fruit sharing by Bossou chimpanzees.

Case No.	Date	Donor	Recipient	Estrous	Next consortship	The amount of papaya fruits					Sharing type
						A	B	C	D	E	
1-1	1 Oct 2002	FF	Pm	No	Yes (estimated)	2	1/2	1 1/2	1/4	—	Active
1-2	1 Oct 2002	FF	Pm	No	Yes (estimated)	—	3/4	1	1/4	1 1/2	Active
2-1	26 Oct 2002	FF	Pm	No	Yes	2	1/3	1 2/3	1/3	—	Active
2-2	26 Oct 2002	FF	Nn	Yes	—	—	1 1/6	1/2	1/4	1 5/12	Recovery
3	8 Dec 2002	FF	Pm	No	Yes	2	$\alpha$	2 - $\alpha$	1	1	Passive
4	10 Dec 2002	FF	Pm	No	Yes	2	$\alpha$	2 - $\alpha$	1	2*	Passive
5	16 Dec 2002	FF	Pm	No	Yes	2	$\alpha$	2 - $\alpha$	1	1	Recovery
6	13 Jul 2004	YL	TA	—	—	2	$\alpha$	2 - $\alpha$	1	1	Recovery
7	21 Sep 2004	FF	Pm	Yes	—	2	$\alpha$	2 - $\alpha$	1 - $\alpha$	1	Passive

Note: FF was alpha male in 2002, and beta male in 2004. YL was alpha male, and TA was gamma male in 2004. Pm and Nn were cycling females during my study period. When the recipient was a cycling female, her estrous condition was noted. Moreover, if the female who received foods from a male donor was not estrous, I checked whether the donor engage in a consortship with the female on the next estrous periods. Case 1-2 and 2-2 occurred after other cases of sharing behavior (Case 1-1 and 2-1, respectively). The amount of fruits was measured by visual estimation: A = The amount of fruits the donor obtained before sharing, B = The amount of fruits the donor ate before sharing ( $\alpha$  means a few bite), C = the amount of fruits just before sharing, D = the amount of shared fruits, E = the total amount of fruits that the donor consumed. — = not applicable. I categorized sharing type by using definition of a previous study<sup>3</sup>. "Active" means that "the donor gave part of its food to the recipient after cutting off a piece". "Passive" means that "the recipient took part of the food that A was holding, and A made no movement to facilitate the action". "Recovery" means that "the recipient took part of the food that the donor had placed on the ground". \* After sharing, FF got one more fruit in the village and consumed by himself.

individuals were one alpha male in Period 1, and three adult males in Period 2. When chimpanzees got papaya fruits, I recorded the timing of food sharing and the amount of fruits by visual estimation. Sharing attitudes (active / passive) were categorized under the definition of a previous study<sup>3</sup>.



Fig. 2. Pm (an adult female) took a papaya fruit that FF (an adult male) had obtained (Case 7).

## RESULTS

Seven episodes of papaya fruit sharing were observed in 222 observation days (Table 1, Fig. 2). The donor always got 2 papaya fruits in the village before sharing. In two out of the 7 episodes, the possessor shared the fruits twice in one episode. It means that sharing behavior occurred 9 times in total. This article reports these 9 cases.

Sharing behavior often occurred just after entering the bush from the village. Especially in five of the 9 cases, chimpanzees ate only a few bites before sharing. In Case 4, a chimpanzee gave one papaya fruit to another individual, and he entered the village again to get another papaya.

In all of the 9 cases, the recipient approached the possessor first, and then showed begging behaviors such as reaching their arms and uttering a slight grunt voice. I did not confirm any grimace by the possessor. Three of the observed cases involved “active sharing” of fruit<sup>3</sup>, where the donor divided it into two (Case 1-1, 1-2, 2-1). Three other cases were “passive sharing”. Recipients took a portion of the fruits that donors were holding, and the donors made no movement either to facilitate or to avoid the action (Case 3, 4, 7). The remaining three cases were examples of “recovery”. Recipients took a portion of fruits that the donor placed nearby (Case 2-2, 5, 6).

In all cases except one, donors shared the fruits with cycling females. In two cases, the cycling female was estrous, and I confirmed mating behaviors during this estrous period. In the other six cases, the cycling females

were not estrous. However, the donor seemed to successfully take the females to a peripheral area as consortship during their next estrous period. I confirmed the consortship by direct observation in 4 cases (Case 2-1, 3, 4, 5), and for the other 2 cases I estimated consortship from daily attendance record (Case 1-1, 1-2).

I reported some cases of papaya fruit sharing, however, the chimpanzees did not always share fruits with other individuals. For example, on December 1<sup>st</sup>, 2002, FF (adult male) started to eat a papaya fruit at 15:36. At 15:43, Ka (adult female) approached FF and stared into his hand. At 15:45, FF moved about 10m and Ka uttered a scream for about 2 minutes. At 15:49, Ka approached FF but he moved away. At 15:52, Ka approached again but FF moved about 5m. Ka uttered a scream. For a minute, FF continued to eat the fruit, then uttered a pant hoot and showed a display behavior.

## DISCUSSION

Bossou is unique, with a chimpanzee habitat surrounded by human settlements. The crops must be very attractive for chimpanzees especially in seasons when food is scarce. However, there seemed to be a sex difference in their attitudes toward humans. All male chimpanzees were ready to enter the village and they did not have to beg others to share fruit. This means that sharing among males seldom occurred, unlike the cases of meat sharing in other study sites. On the other hand, some female chimpanzees were too shy to have access to the village easily. Such a difference in accessibility among individuals may be the cause of fruit sharing behaviors at Bossou.

Nishida and Hosaka reported that chimpanzees tend to pass worse or smaller food when they share food<sup>19</sup>. In my observation of 9 cases, chimpanzees always shared less than equal half of the fruits. However, they shared fruits in early phase before feeling full. This means that they gave up fruits still of value to them. Why does food sharing occur? Do donors just want to avoid begging or harassment<sup>17, 22</sup>? Maybe not. Begging is not always rewarded (e.g., the FF-Ka episode mentioned above).

Then why did the Bossou males share such valuable fruits with non-kin others? Here I postulate that papaya

sharing contributed to an increase in his chances of copulations in the future. First, eight out of 9 cases were from adult male to cycling female. Especially Pm (adult female) was often observed to receive papaya fruit from FF. In 6 cases, Pm was not estrous at the time. However, FF successfully took her to a peripheral area for the next estrous period. In the Bossou group, there were 4-5 cycling adult females during the study period. However, all but 2 females had not given birth for more than 8 years. Moreover, one of the 2 females is the mother of FF. The number of sexually receptive females was so limited at Bossou. FF may have tried to make a good relationship with Pm, even if she was not estrous.

**Acknowledgments.** I thank Professor T. Matsuzawa for his supervision and advice. Thanks are due to IREB, colleagues of KUPRI-International team and the local assistants. This study was financed by a grant from MEXT 16002001 to T. Matsuzawa, a grant under Research Fellowships of the JSPS for Young Scientists (#160896) and a grant of the Kyoto University Foundation to G. Ohashi.

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